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# DISEASES *of the* CHEST

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## DISEASES

OF THE

## CHEST

Official Organ of the Federation of American Sanatoria  
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(A MONTHLY PUBLICATION)

*"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind."*

*Lawrason Brown, M. D.*

## Editorial Comment

### Influenza and Tuberculosis

INFLUENZA undoubtedly has an influence on the development of pulmonary tuberculosis. It is the general opinion of authorities that influenza prepares the terrain for the development of chronic catarrh and predisposes the organism of the patient to the development of the disease. Many authorities state that in at least 50 percent of their cases of pulmonary tuberculosis, the evolution of the diseases was related to an attack of influenza. As a rule the post-influenzal symptoms are so trivial that they are scarcely noticed at the time. Histories of these patients show a slow, but progressive loss of weight, slight fever in the evenings, weakness, and incapacity for physical and mental work. Cough and other symptoms, which erroneously have been considered as early symptoms of pulmonary tuberculosis are absent. Early diagnosis is possible, however, in these slow progressive cases following influenzal attacks, by estimating the symptoms given by tuberculous toxemia, the evaluation of which is important in controlling further development of the disease. It must be remembered that many toxic symptoms of tuberculosis may be present, when both the clinical and Roentgen examinations fail to prove the presence of tuberculosis.

C. M. H.

### Bring the Line up to the Flag

THE INNOCENT invasion of innumerable innovations in the social and political application of modern medicine has seriously disturbed the sanctity of the individual medical practice. The ease with which doctors and their own medical organizations have been hoodwinked by so-called socially progressive movements now becomes alarming. It is high time for the medical profession to assert its independence and take a firm stand against the camouflaged invasion of various movements into the practice of medicine. Cloaked with sappy sentiment and maudlin devotion to a chimerical ideal of serving humanity, many of the local, state, and national programs have actually absorbed many legalized and professional features of the medical profession. These movements have stolen the prerogatives of the practice of medicine to such an extent that the physician frequently becomes only the legalized symbol of medical practice.

The innocence with which many of these social betterment programs have been conceived, erected, and entrenched into our social, civic, and professional fabric is worthy of cold dispassioned analysis by our suffering profession. It seems reasonable to assert that we have been hoodwinked into programs that are now about to engulf and swallow us up.

All of these movements and invasions have been so innocuously imposed that we serve upon their boards, aid, abet, and support them. We are taxed to pay for our own competition.

But we alone are responsible for these disasters of progress. We have stood by and watched these movements develop. We have even taken a large part in their growth. We have helped to sprinkle them with sentiment and with argument; possibly with some measurement of personal aggrandizement. We must assume much of the responsibility for the local, state, and national success of many of these movements. Likewise, we must now demand that there are certain professional limitations to them. Have we allowed these movements too much freedom and are they now so entrenched that they are outside and beyond our control?

Surely there are more and better things than the present scheme of things, medical. There are more virtues in positive, progressive plans than in the negative attitude of mere preservation of the good old days. Times change and we must adapt ourselves to the changing times, but there is no sense in letting those with no medical training run away with the flags of medical progress. Bring the line up to the flag.

E. H. S.

### **Tuberculin in the Treatment of Tuberculosis**

IN SPITE of the fact that the use of tuberculin and other protein extracts of tubercle bacilli as a therapeutic measure in tuberculosis came into disrepute shortly following Koch's announcement of its value, a respectable number of phthisiotherapists have continued its use in carefully selected cases with satisfactory results.

Like many other therapeutic measures its discovery and announcement were hailed with much enthusiasm and its adoption by a profession which was feverishly waiting for some remedy which would quickly cure tuberculosis was universal.

Men who knew little of the pathology of tuberculosis began its administration in

all classes of cases, and in all stages of the disease. Little attention was paid to the individual characteristics of the patient, or to the regulation of dosage according to the reactions which were obtained in its administration. On the other hand, the same suggested schedule of dosage was apparently used in every individual to whom the treatment was administered. As a natural result much damage was done and the use of tuberculin as a remedial agent was strongly condemned.

A small number of physicians, however, probably because they were more observant and more conservative in its use than the rank and file, continued to use it in carefully selected cases and with proper caution, and they have observed favorable results.

The manner in which tuberculin brings about the results which have undoubtedly been obtained, we believe, is not yet thoroughly understood.

Doubtless, allergy plays some part in it, but that subject is too exhaustive to discuss in detail. It is likely, too, that there is some effect upon the cellular content of the blood which increases the patient's immunity.

The most spectacular and satisfactory therapeutic results have been secured in the treatment of tuberculosis in the eye. This is probably due to the fact that the dosage can be more satisfactorily regulated as a result of the ability to observe the focal reaction in the eye.

The clinician, in collaboration with the eye specialist, can treat these cases more intelligently than where the infection is elsewhere in the body.

There are two types of chest cases in which good results have been obtained:

1. The patient with the very early lesion where there is little evidence of toxemia.

2. The patient in whom the disease has been present for a long period, but where there is little destruction of tissue, and there has been some improvement, but the disease is apparently stationary.

It must be remembered that tuberculosis is a disease which progresses very

slowly either way, and therefore rapid or spectacular results should not be expected from any method of treatment.

It is our opinion, based upon years of experience, that if patients are properly selected, and due care is used in adapting the treatment to the individual, and one does not follow any so-called schedule of dosage, good results will be obtained with the use of tuberculin.

R. B. H., SR.

**Rocky Mountain Tuberculosis Conference** THE SECOND bi-annual meeting of the Rocky Mountain Tuberculosis Conference will be held this year at Albuquerque, New Mexico on September 28th and 29th. This Conference was organized on June 8th, 1932 at the annual meeting of the National Tuberculosis Association held at Colorado Springs, Colorado, that year. The first clinical and sociological program was presented at Colorado Springs in 1934. More than Five Hundred physicians and others interested in tuberculosis attended the Colorado Springs meeting and the committee anticipates a larger attendance at the Albuquerque meeting this year.

Dr. LeRoy S. Peters of Albuquerque is the President of the Organization, Dr. H. J. Corper of Denver is the Vice-President, and Dr. Arnold Minnig of Denver is the Secretary-Treasurer. Dr. Chas. W. Mills of Tucson is the Chairman of the Clinical Section of the meeting and Miss Helen L. Burke, Executive Secretary of the Colorado Tuberculosis Association, is in charge of the Sociological Section.

Members of the State Program Committee are: Drs. Charles O. Giese, Colorado Springs, Colorado; Robert O. Brown, Santa Fe, New Mexico; Samuel H. Watson, Tucson, Arizona; H. R. Kanable, Basin, Wyoming; John F. Allen, Omaha, Nebraska; Ralph C. Matson, Portland, Oregon; Munford Smith, Los Angeles, California; Philipp Schonwald, Seattle, Washington; Lewis J. Moorman, Oklahoma City, Oklahoma; Fannie Dunn Quain, Bismark, North Dakota; O. F.

Swindell, Boise, Idaho; and Robert B. Homan, Jr., El Paso, Texas.

A fine program is being arranged and the committee extends an invitation to physicians and others interested in tuberculosis to attend this two day Conference.

M. K.

### Pre-School Round-Up

THIS is the season of the year that, in many cities and communities, brings the annual pre-school round-up of young children who are just beginning their education. The complete physical examination of these children by the family physician, or in groups under the auspices of the county medical society is of great importance to their future health and the general health of that particular community.

It is obvious that physical defects of all types and particularly those of sight and hearing should be discovered and corrected in order that the child will not be handicapped in the schoolroom. The examination will be only partial, however, if it does not include a tuberculin test followed by x-ray of the chest of all positive reactors. It is well known that the accurate diagnosis of childhood tuberculosis is impossible through simple physical examination. We believe that this test is as important as the smallpox vaccination.

It seems to us that these examinations offer the private physicians an opportunity to be of inestimable service to their communities through preventive measures and the correction of defects which are so often the cause of suffering and disease in future life. We cannot emphasize too strongly, therefore, that each examination be complete and include the Mantoux test. An incomplete examination is worse than none at all because it gives the child's parents a false sense of security.

R. B. H., JR.

A "sour" patient is a patient with an unfavorable prognosis. Keep your patient happy and you will be more likely to keep him healthy.



## Report of the Statistical Committee of the Federation of American Sanatoria \*

SHORTLY AFTER our Albuquerque meeting the Statistical Committee, there appointed, set about gathering information from sanatoria to be used by the business office of the Federation in working out a better understanding between public and private sanatoria.

As a basis for this information a questionnaire comprising sixteen questions, suggested and approved by the committee, was sent to 146 sanatoria throughout the country. A few of these sanatoria answered at once. Others, perhaps not realizing that these statistics are necessary in order that the Federation may function, required as many as four follow-up letters, including air mail and special delivery, before replies were received. This extended the work of the committee in gathering statistics well into the past month.

In all, a total of 101 replies were received. These were sorted to determine the privately owned institutions which met operating costs and which were sufficiently interested in the work of the Federation to fill out the questionnaire. We found sixty-four sanatoria in this classification, which offer the basis for our statistical summary.

At this point, I want to thank those sanatoria who submitted detailed and accurate answers to our questionnaire. It was a task, but the Statistical Committee very much appreciates your response. Some sanatoria, admittedly, gave rough estimates or indefinite and occasionally misleading statements so that their figures could not be used.

In these 64 private sanatoria, scattered throughout the country, there are 3348 beds available for tuberculous patients. Twenty-five of these sanatoria each contain 30 or less beds. Seven sanatoria have

BY

E. W. HAYES, M. D.\*\*

Monrovia, California

over 100 beds. The average is 52 beds.

In these institutions there were 1182 vacant beds on an average during 1935, which is slightly over one-third of the total available beds. Five sanatoria reported no vacancies during 1935. Seventeen sanatoria reported one-half or more of their beds vacant during the same period.

Approximately one-half of the 64 reporting sanatoria classify themselves as closed institutions.

About the same proportion have one or more resident physicians. Many which did not list a resident have the Medical Director living nearby and readily available.

Twenty-nine sanatoria are fully equipped with x-ray, laboratory, and facilities for chest surgery, according to their statement. Twenty-three are so equipped except for major chest surgery, which is handled in nearby hospitals. Of the sanatoria reporting no equipment, most are operated by individual doctors, who maintain their own x-ray and laboratory.

The minimum rates in this group of sanatoria *without* medical attention range from \$10.00 to \$42.00 a week, with the average being \$20.95. The minimum rates *with* medical attention which, in most instances, includes pneumothorax and, in some instances, includes x-ray also, range from \$15.00 to \$38.50 a week, with the average being \$24.65. We noted that each section of the country seems to have its own competitive rate, which is met by the other sanatoria in that district. One hospital, which received \$3.00 a day, extras added, for each of its tuberculous patients, felt that this could not be fairly expected to include medical attention.

The patients entering these 64 private institutions are largely referred by other physicians. Forty percent of the sanatoria reported that almost all their patients

\*Presented at the Kansas City Meeting, May 12, 1936.

\*\*President-elect, Federation of American Sanatoria.



were referred, while a total of eighty percent reported that half or more of their patients were referred by other physicians.

In general, sanatoria located near large cities draw their patients from these cities; otherwise the patients coming from rural and urban centers are quite evenly divided, the number from urban districts being slightly greater than from rural. Likewise, most sanatoria draw their patients from their own state or adjacent states, except in the recognized health centers, where patients come from all parts of the United States, Canada and Central America.

Only 25 sanatoria reported the condition of patients upon entering their institution. Fifty-two percent of these were far advanced cases, 34 percent were moderately advanced and the remainder were minimal or early cases. According to the reports we received, all except one private sanatorium have the vast majority of their patients in the first two classes.

In no reporting sanatorium did the death rate exceed 30 percent, the average being between 6 and 7 percent.

The extent to which collapse therapy is used varies greatly with different sanatoria. Three reported only 3 percent of their patients so treated, while four sanatoria reported 80 percent of their cases so handled. These were the extremes, with the average in all sanatoria being 34 percent.

The length of the patient's stay, likewise, varies greatly with each sanatorium, the minimum being three months, the maximum being three years and the average being a little over nine months. Many of the sanatoria keeping their patients but a few months consider themselves as schools to teach the patient a correct mode of living to combat his disease. The patient's finances, in many instances, are the determining factor in the duration of his stay in the sanatorium.

In 15 of the 64 sanatoria considered, 75 percent or more of the patients leave after being discharged; in 10 sanatoria 25 percent or less are discharged. The

average is 52 percent. The remainder of the patients leave of their own accord without the approval of the physician in charge.

In these reports it was stated that practically all these patients return home and some 47 percent, on an average, return to work. These, of course, are estimates, since only four of the reporting sanatoria keep follow-up records, with one other just commencing. Many sanatoria keep in touch with former patients through visits and letters. The figures from two of these sanatoria with follow-up records are appended.

It is the purpose of this committee to send out subsequent questionnaires from time to time in order to keep available information as up to date as possible. We trust that, with a better understanding on the part of the sanatoria, their response will be more prompt and perhaps more accurate.

The first sanatorium reported on the patients for the life of the institution. Reports were received from 2064 patients. Of these

1659 or 88.1% were reported alive.  
56 or 2.97% were reported dead.  
73 or 3.88%—no information as to whether living or dead.  
95 or 5.05% could not be found by postal authorities.

#### Of the 1659 reported alive

1501 or 90.48% were in satisfactory state of health.  
129 or 7.77% were in unsatisfactory state of health.  
29 or 1.75%—physical condition indefinite.

The report from a second sanatorium covered the years 1929 to 1934 inclusive and was based on the results of treatment with or without pneumothorax.

|                         | With Pneu-<br>mothorax | Without Pneu-<br>mothorax |
|-------------------------|------------------------|---------------------------|
| Well and working.....   | 40.6%                  | 18.8%                     |
| Alive but not well..... | 7 %                    | 14.6%                     |
| Dead .....              | 43.5%                  | 54.6%                     |
| Untraced .....          | 8.8%                   | 12 %                      |

The third sanatorium reported that after five years 90 percent of their patients showed no change, while 10 percent were worse.

The fourth sanatorium reported that after five years 25 percent were dead.

## Compression Therapy in Far Advanced Pulmonary Tuberculosis \*

DISEASE ARREST in far advanced pulmonary tuberculosis often requires some radical procedure of com-

pression therapy. It may be necessary to employ a combination of well selected procedures before the desired aim of therapy is obtained. Therefore, it seems essential that one should be able to estimate fairly accurately just about what result can be expected from any particular procedure of compression therapy. He should not only have a working knowledge of the individual methods but should be able to use these various steps in such combination as to best suit the needs of the particular patient to bring about the most immediate cessation of the activity of tuberculous foci. This knowledge is extremely essential and we believe that it is knowledge that can only be gained through experience.

The majority of our patients whom we are called upon to treat are in the advanced stage of tuberculosis. It is estimated that 80 percent of the patients admitted to Sanatoria throughout the country have the disease in an advanced stage. The average tuberculous individual usually does not consult a physician until symptoms are well pronounced; usually they have existed for some time. Frequently the x-ray film made at the time of the initial examination shows definite cavity formation. Rather frequently routine x-rays are not made and through an error in diagnosis further disease progression is permitted. Proud as we are of our advance in the medical sciences, unfortunately the majority of the profession do not share in this advance and patients suffer. The extensive campaign which has

BY

WM. C. POLLOCK, M. D.\*\*

Denver, Colorado

been carried on urging early diagnosis in tuberculosis apparently has not accomplished the one essential, that of physicians being tuberculosis conscious. Many instances of a failure to diagnose the condition clearly demonstrate that the physician simply did not keep tuberculosis in mind. Much has, however, been accomplished along the line of early diagnosis by our tuberculosis surveys made of school children and college students.

It seems that with our present knowledge and methods of conduct we will have with us the usual run of far advanced tuberculous patients.

The problem of obtaining and maintaining disease arrest in these far advanced patients often seems rather remote, but a proper selection of adequate measures often yields satisfactory results. Even a hasty consideration of these patients convinces one that treatment, of necessity, should be rather drastic in character. The vast majority that have the disease bilaterally, are of long duration, and no one procedure, no matter to what extent it may be one's hobby, can universally attain the desired aim of therapy.

It seems that there is becoming manifest, in our field of endeavor, two outstanding faults, one being a tendency of individuals to really inadequately treat patients because of an adoption of a particular method of therapy as a hobby. The other is a tendency of those more surgically minded to employ only surgical methods, ignoring the several valuable and definitely well established medical methods. Many attempts to greatly shorten the period of treatment by recourse to rather radical surgical measures upon patients in whom the extent of the tuberculous process is of a character and distribution entirely too minimal to war-

\*Published by permission of The Surgeon General, U. S. Army; Medical Service, Fitzsimons General Hospital, Denver, Colorado. Read before the Denver Sanatorium Association, March 6, 1936.

\*\*Major, Medical Corps, Clinical Director of the Enlisted Tuberculosis Section.

rant therapy so drastic in nature, are made.

It seems that the individual who acts as the directing force of an institution or of a group should maintain a rather even keel when it comes to the selection of patients for a particular procedure or combination of procedures of collapse therapy. Unbiased, well balanced ideas regarding therapy, without undue stress of any one method, result in a selection of therapy best suited to the particular problem encountered. No one can "ride" a special "hobby" in therapy without giving it undue consideration at the expense of other well recognized steps in treatment and this may prove detrimental to the patient. These individuals tend to defend their position by unwarranted condemnation of some of our best procedures of therapy. For example, if they prefer not to use pneumothorax at all or but rarely, they verbosely discuss and tend to magnify the difficulties and complications of induced pneumothorax. Complete or partial pleural symphysis, the prevalence of pleuro-pulmonary adhesions, the difficulty of dealing with pleural adhesions, the incidence and severity of attendant complications, long duration of the therapy, and the ever present potential danger of reactivation even after pulmonary re-expansion are discussed fully in order to discredit pneumothorax as a method of therapy in tuberculosis. This action on the part of individuals often considered rather outstanding in the surgical field, may have a decided influence, likely detrimental, upon those physicians who are yet in the formation stage of their ideas concerning therapy in tuberculosis.

There are, of course, many patients presenting a type and distribution of nodose tuberculous lesions so extensive as to involvement of the lung fields that thoracoplasty is precluded and phrenic nerve surgery is inadequate compression therapy. Patients presenting the pneumonic type of tuberculosis or with recent extensive midlung spread resulting from bronchogenic aspiration from the oppo-

site lung are not suitable patients for thoracoplasty. Patients with thoracoplasty who develop in the contralateral lung a bronchogenic spread or a reactivation of lesions already present are not best suited for radical surgical collapse.

In any large series of patients one finds many many examples where thoracoplasty is unsuitable as the proper method of therapy. These patients are far more suitable for pneumothorax treatment, for by its use it proves to be adequately effective in that the disease is arrested and that in the end it is more conservative, since a greater amount of lung tissue is preserved for future function. Though the superiority of radical surgical collapse may be greatly stressed from all of its advantageous angles, we will always have far advanced tuberculous patients presenting conditions of a nature to preclude thoracoplasty, but who, on the other hand, are suitable for pneumothorax therapy.

We are of the opinion that there are definite indications for each of the modern methods of therapy in tuberculosis, as well as indications for their use in various combinations. Often the indication for a certain procedure may not be so definite that other measures may not require consideration. In other instances the indication for some one procedure seems very definite. We prefer to use phrenic nerve surgery, pneumothorax therapy, the various modifications of thoracoplasty, intrapleural pneumolysis, etc., selecting the particular type of therapy, or a combination of the various types, as to best suit the needs of the individual patient. In many patients we have used about the most radical treatment possible, but in so doing, it was absolutely essential in order that the therapy be adequate in character. Treatment should be adequate; compression should be effective, yet by employment of measures, as conservative as possible.

In far advanced tuberculous patients one should select, if possible, the simpler, more conservative measures, yet select ones sufficiently adequate to effect disease arrest, always attempting to visual-



lize the end result as to conservation of functioning pulmonary tissue, and the effect of compression upon other thoracic organs, especially the heart. Since we wish our patients to purchase their health at the lowest possible cost in lung tissue, one may be justified in attempting simpler methods more or less as a trial, reserving the more radical types of therapy for failures encountered. In doing so, however, ineffective therapy should not be employed initially when it is more or less clearly seen that the particular measure will be inadequate, and when there is some interference to make the procedure definitely ineffective, it should not be unduly prolonged before additional adjuncts of therapy are employed. Workers may be extremely radical in inducing collapse therapy yet present a definite conservative trend in that therapy used in a particular patient seems to be absolutely required for disease control or arrest. The successful therapist recognizes the necessity of supporting the more modern compression adjuncts of therapy by prolonged rest regime.

#### *Bilateral Pneumothorax Therapy*

In the majority of our patients with advanced bilateral tuberculosis we first consider them as candidates for bilateral pneumothorax induction. Our experience with these patients leads us to believe that it is rather difficult to accurately conclude whether or not the gaining of an effective pneumothorax space is possible or impossible, though we consider all available data. We believe that in the vast majority of cases the patient should be given the advantage of an attempt at induction. This belief we have held and followed over a period of more than six years during which period we have performed over 1000 initial pneumothoraces without a death by air embolism.

In our infirmary wards today 71.3 per cent of the patients have had some form of collapse therapy induced. Of this number 43 per cent have only unilateral pneu-

mothorax, 14 per cent have bilateral pneumothorax, 8 per cent have thoracoplasty alone, 5.7 per cent have had phrenic nerve surgery as the sole procedure of compression while the additional patients have had a combination of the various procedures. For example, 20.9 per cent of all pneumothoraces have as an adjunct to that therapy phrenic nerve surgery either in the form of an exeresis or temporary paralysis, usually in the form of permanent, hemidiaphragmatic paralysis. We, therefore, have in our infirmary wards 28.7 per cent of the patients who have no form of collapse therapy. Some few of this group have far advanced, fibrous type of tuberculosis and are elderly patients in whom the optimum time for induction of collapse therapy is long past. Some few others refuse treatment and we always have a group of patients in whom pneumothorax is impossible because of the lateness in the stage of the disease when admitted at our institution and in whom other methods of treatment seem unsuitable. In all these patients there was a time when collapse therapy was indicated, but, unfortunately, it was not accomplished.

The difficulties encountered in the induction and in the maintaining of pneumothoraces bilaterally are great and one is, indeed, fortunate to attain his objective. Frequently additional adjuncts or radical surgery have to be employed instead of continuing the pneumothorax on one side or the other because of partial pleural symphysis or extensive pleuropulmonary adhesions. Experience with bilateral pneumothorax has taught us much concerning the healing of tuberculous lesions and closure of pulmonary cavities under negative intrapleural pressure with partial pulmonary compression.

There has always been considerable discussion in regard to the amount of pulmonary compression essential to produce disease arrest. Some advocate rather complete pulmonary collapse under pneumothorax, stating that this is essential in order to heal tuberculous foci. They be-



lieve that the positive intrapleural pressure required to accomplish this is not a factor of complications of the therapy. Those advocating partial pulmonary compression or the expansile type of pneumothorax believe that the lung rest obtained is sufficient to permit healing, that complications are less under constantly negative intrapleural pressure and that the gaining of pulmonary re-expansion at the termination of the therapy is more easily obtained. Since about 40 per cent of artificial pneumothoraces have pleural adhesions traversing the pneumothorax space visualized on the x-ray film, since bilateral pneumothorax is advocated by many workers and due to the fact that contralateral pneumothorax is used in the presence of thoracoplasty, there are examples of instances where complete lung collapse is impossible or inadvisable yet excellent results are obtained under the partial compression. We have advocated and used the expansile type of pneumothoraces and have obtained excellent results.

It seems rather obvious to us that in many patients one has to content himself with only partial compression or else classify a rather high percentage of his pneumothoraces as unsatisfactory. As a matter of fact, some few workers are inclined to do this and in a rather too hasty manner suggest discontinuance of the pneumothorax and the substitution of thoracoplasty. Unwarranted delay in inducing therapy sufficiently adequate to supplant an inadequate type is not justifiable and may prove to be a costly error in judgment. Undue haste with permanent sacrifice of pulmonary tissue capable of future function, if treated more conservatively, may also prove to be an error rather detrimental to the patient. It seems important, before concluding that pneumothorax will not accomplish the aim of therapy, to carefully consider the pre-compression lung pathologic changes, the effect of compression on that pathologic condition, and make a careful estimate of the situation in order to determine whether or not the pneumothorax is yet

capable of producing results. In certain patients it may be clearly shown that eventually a thoracoplasty will be necessary, but further treatment by pneumothorax may clear areas of the lung, thereby limiting the extent of thoracoplasty required later.

Too much clinical significance is attached to pleuro-pulmonary adhesions by many doing tuberculosis therapy. While adhesions are troublesome in pneumothoraces in that they limit lung compression, hold cavities patent, and are etiologic factors of certain complications of the therapy, the majority of pleural adhesions are not clinically urgent matters, as some would have you believe, in that they require no special adjuncts of therapy. Even when cavities are only reduced in size and are yet patent ones, there is no set interval of time when one should definitely state that other measures are demanded. The minority of adhesions are of definite clinical significance and should receive special attention. In our experience, during the past few years, the addition of hemidiaphragmatic paralysis as an adjunct to the pneumothorax will suffice to close the vast majority of these cavities held patent by adhesions. Certainly closure of these cavities should first be attempted by phrenic nerve surgery, reserving intrapleural pneumolysis with cauterization of the offending adhesions for those patients who have failed to close their cavities by phrenic nerve surgery.

Notwithstanding all of the difficulties encountered, we have found bilateral pneumothorax therapy a very successful procedure. We have used this type of treatment in 150 patients, many of whom have been carried on to completion with re-expansion of the lungs. The complications encountered are frequent and often severe, but one should remember that he is dealing with far advanced tuberculous patients often with depressed tuberculo-immune qualities and in whom the prognosis for recovery is practically hopeless without collapse therapy. In considering the possibility of complications, one should remember that in far advanced

tuberculosis untreated by compression certain pulmonary as well as extra-pulmonary tuberculous complications such as laryngitis or enterocolitis may soon make their appearance, possessing a gravity far outweighing the usual complications of bilateral pneumothorax.

In 1931 we stated:

1. Advanced bilateral pulmonary tuberculosis may be arrested by bilateral pneumothorax.

2. Bilateral cavitation may be eradicated.

3. A rapid fatal termination from bronchogenic spread to the contralateral lung may be prevented by converting the case from a unilateral to a bilateral pneumothorax.

After five more years of experience we do not wish to substantially alter these conclusions.

#### *Thoracoplasty and Contralateral Pneumothorax*

In patients with bilateral tuberculosis sufficiently far advanced to warrant bilateral collapse and in whom pneumothorax is impossible or definitely inadequate as to type of collapse obtained and in whom phrenic nerve surgery fails to accomplish the desired result or is considered an unsuitable procedure *thoracoplasty* is performed in the presence of contralateral pneumothorax. When this is considered absolutely essential in order to accomplish disease control, we are, indeed, dealing with therapy rather radical. Especially is this true in patients with extensive lesions and larger cavitation. This type of radical collapse therapy is possible because of the use of an expansile type of induced pneumothorax and because the thoracoplasty, while radical as to the length of ribs removed or resected, is limited in that the operation is restricted to those ribs just sufficient to collapse the involved area of the lung.

Thoracoplasty in these patients is delayed until the pneumothorax is well established and can be maintained by

small refills at weekly or ten day intervals. When possible, without undue hazards to the patient, we have delayed the thoracoplasty until the pneumothorax has the disease of the contralateral lung definitely under control. In selected patients we attempt to prevent further progression of disease in the lung selected for collapse by thoracoplasty with hemidiaphragmatic paralysis or by continuing the inadequate pneumothorax.

When thoracoplasty is performed it should be well planned and divided into several stages, each being sufficiently minimal in order to avoid an undue operative risk. The upper three ribs are removed in their entirety, but additional stages should be less radical in that only the bony portions of the ribs are resected. When cavities remain patent following the above operative procedures, an anterolateral stage may then be performed, inducing complete pulmonary collapse with cavity closure. This manner of planning the operation ultimately produces complete collapse, but accomplishes the collapse so gradually that the patient has an opportunity to adjust himself to each decrease in pulmonary function. Rather radical collapse may be obtained in the presence of an expansile contralateral pneumothorax with both procedures sufficiently adequate to result in disease arrest if induced gradually as outlined above.

We have performed thoracoplasty in the presence of a contralateral pneumothorax in 20 patients and have induced pneumothorax contralaterally following thoracoplasty in several other patients with only one operative death. In one patient death followed a superimposed spontaneous pneumothorax on the pneumothorax side three days after the thoracoplasty. Of this series, ten patients have been carried on to completion of treatment in that the pneumothorax therapy has been completed and pulmonary re-expansion accomplished. Considering the entire series, 71.4 per cent of patients have closure of cavities bilaterally with negative sputa while 28.5 per cent present

patent cavities with positive sputa. Further surgery may yet be utilized in a few of these patients who still have patent cavities. It is believed that in this type of work failure to close cavities is not because of inability to perform a technically satisfactory thoracoplasty, but more because of inadequate rib resections as a forced issue. These patients, especially those with large infraclavicular cavities, are unable to withstand the more radical stages of thoracoplasty and one should be content with marked reduction in the size of cavities and utilize further surgery at a later date when the patient has somewhat adjusted himself to the induced collapse of the lung.

### *Thoracoplasty*

Thoracoplasty is one of the greater advances in the treatment of pulmonary tuberculosis. When definitely indicated, there is no other therapy which can take the place of surgical collapse by thoracoplasty.

Our thoracoplasty patients are selected from the group in whom pneumothorax can not be induced at all or in whom the collapse obtained is inadequate and from phrenic exeresis patients in whom simple hemidiaphragmatic paralysis fails to yield satisfactory healing.

We attempt to use more conservative methods of therapy initially, reserving thoracoplasty for the failures of other therapy.

Selection of patients for surgical collapse should be made by a phthisiologist. All phases of therapy in tuberculosis should be under the guidance of the phthisiologist. He should select patients, choose the time of operation, recommend the type of thoracoplasty and number of stages, attend the patient during operation, assist in post-operative care, and supervise the necessary rest therapy following surgery.

In the past, it has been rather difficult to know the exact extent or type of various operators' thoracoplasties. More and more thoracoplasty is coming to mean re-

moval of the first three ribs in their entirety, including the vertebral transverse processes, with extremely wide resections of ribs sufficient to gain adequate collapse of the involved area of the lung. When cavities remain patent they should be reoperated with removal of regenerated ribs and further resection of the rib cartilage anteriorly. A more radical reoperative procedure consists of removal of regenerated ribs with the introduction of an extra periosteal gauze pack.

The removal of ribs in their entirety or the extremely wide resection of the lower ribs requires more operating time and the resultant collapse is great and the procedure is not well tolerated by the chronically ill patient; therefore, the number of ribs removed or resected is necessarily limited. Left sided operations require considerable caution. It seems that in a great many patients it would be better to perform the upper stage (3 ribs) and at subsequent operation resect only the bony portion of the ribs and then perform an antero-lateral for removal of the cartilages of the ribs. The results obtained by thoracoplasty as to closure of cavities are variable as to the percentage of closures as reported by various workers. It is believed that this is due to the type of operation used and is also influenced by reoperative procedures. If one should delay his report until all patients showing patent cavities, following routine thoracoplasty, have been reoperated then the percentage showing cavity closure should exceed 90 per cent.

We have suggested that, since rib removal rather than resection is the order of the day in thoracoplastic surgery, the operation should be less radical posteriorly and followed by an antero-lateral operation. The division of an adequate thoracoplasty into too many phases, while it lessens the operative mortality, has an objection in that patients object to too many operations. This may seem a rather illogical point to consider, but we have had several patients refuse further operative treatment when the job

(Continued to page 26)



## Indications for Resection of Lower Ribs Following Apicolytic Thoracoplasty

WHEN THE Sauerbruch paravertebral thoracoplasty was first put into practice it was the custom to perform the operation in one stage. Then, when the danger of so great a procedure became evident, two or more steps replaced the single one, and at once the operative mortality was reduced.

The usual procedure was to begin the collapse by resecting the lower ribs, leaving the upper ones until the last. But it is exactly these upper ribs which are responsible for the maintenance of pulmonary cavities in the apex and upper lobe of the lung where they are most frequent.

The next improvement in technique was to begin the operation by resecting the upper ribs as the most logical sequence, dividing the plastic into two or more stages, the lower ribs being the last to be resected.

Finally, it was recognized that if the first rib was completely removed with large sections of the second and even the third, the chance of upper lung collapse would be better. But even with the most painstaking work a number of the cases were not ideal and, though great x-ray improvement was manifest, tubercle bacilli continued to be present in the sputum because secreting tuberculous areas were still present. Evidently, we were unable by mere extirpation of ribs to exert in all cases sufficient pressure upon the walls of the cavities to bring them firmly together.

Apicolysis was undertaken, at first, after unsuccessful thoracoplasty; and the outlook for permanently effacing the cavern was thereby improved. But whether the apicolysis was done by packing with gauze or by implanting foreign substances such as paraffine as a permanent plug (plombage), everything depended upon the maintenance of the obliteration secured at the time of operation, a consum-

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mation devoutly to be wished for, but by no means certain of achievement.

For a number of years I have employed a device which seems to have advantages over others since there is provided constant *elastic* pressure which increases the size of the new extra-pleural space. Without distress to the patient, this forcibly approximates the walls of the tuberculous cavity.

I have several times described the procedure 2, 3, so it will now be merely referred to by stating that the salient point is to resect subperiosteally the upper three to five ribs, according to the size of the diseased part, and to make a space by digital pressure upon the tissues beneath the ribs including the periosteum, the endothoracic fascia and the pleura, usually adherent to the lung, and filling this space with elastic crumpled rubber dam. The dam is buried in place by suturing the soft parts of the chest wall over it but leaving enough protruding through the wound so that it may be removed in three or four days. X-ray films made before the rubber has been extracted will reveal a space outside the pleura, two to four times larger than that secured at the operation. A soft drainage tube is inserted, and pressure by elastic rubber sponge strapped over the infraclavicular region and in the axilla will tend further to effect compression. The results in my hands have been gratifying, and in later operations I have left the first rib uncut. The cases in which this modification has been tested have given me further encouragement, and I hope soon to publish a full description.

And now, coming to the matter suggested by the title of this little paper, I find that there is not much to say which is not fairly obvious. Given a well-functioning opposite lung and a lower chest



on the side of operation which contains healthy or quiescent, though perhaps infected pulmonary tissue, there is, to say the least, no reason for haste in completing the thoracoplasty, even in the presence of doubtful areas.

When there has been no previous phrenic nerve interruption, this procedure is now advisable with a subsequent period of observation which will finally determine the necessity for the resection of the lower ribs. If the phrenic has already been crushed or cut, the period of delay after the apicolysis should be shorter because the hope of favorable progress following the nerve blocking is absent.

When there is active disease in the remainder of the lung which will probably yield to compression, resection of the lower ribs in one or more stages should be undertaken with as little delay as possible; the urgency is greater when cavities are present or when the alarm of hemoptysis occurs.

Occasionally the apicolysis may have obstructed a lower bronchus or even the lower lobe bronchus with resulting atelectasis. If things are progressing satisfactorily in other respects, this accident by no means signifies that there is haste in completing the thoracoplasty, for the occluded passage may become pervious with full restoration of pulmonary function.

Efficient artificial pneumothorax in the pleura below the apicolytic field may be continued until the lung is well enough to re-expand or until it becomes clear that this form of therapy is futile, when the completion of the plastic is in order.

Non-tuberculous empyema in the lower pleura of the tuberculous side and in the presence of presumably "good" lower lung should be treated according to the rules of thoracic surgery. Thus the non-tuberculous part may be saved. If, however, the empyema is tuberculous, drainage followed by lower thoracoplasty is the treatment most likely to produce an arrest. It should not be forgotten, however, that even here the lower part of the lung may be worth saving, and that it

may resume its function when the empyema has disappeared. Such a result is, however, unfortunately rare. Benign obliteration of the pleural space by adhesion of visceral and parietal layers will almost certainly occur.

### *Concluding Remarks*

1. When the principal location of destructive tuberculosis with cavity formation is in the usual place, the apex and the upper portion of the superior lobe, it is manifest that here should be the field of primary surgical attack.

2. This should have for its object, as a general rule, the total compression of the diseased portion with its cavities harboring bacilli which are being expelled by cough, to the public danger.

3. Instead of the wasteful destruction of healthy pulmonary tissue formerly brought about by complete thoracoplasty, we should do all in our power to preserve healthy lung. Not only is this the correct procedure from the surgical point of view, but if at some future time the patient must fight a pneumonia or some other spreading pulmonary lesion, every area of functioning lung may be of life-saving importance.

4. Upper thoracoplasty with direct apicolytic compression should be our first step in nearly all cases looking toward the direct abolition of tuberculous spaces. If the lower portions of the lung are not obviously hopeless, little will be lost by vigilant delay.

5. In the doubtful cases, the advice of an experienced phthisiologist is indispensable to the surgeon.

6. The physician should call for surgical counsel as soon as the idea of operative treatment is considered.

(1) Lillenthal, Howard: Logical Sequence in Two-stage Thoracoplasty. *Arch. Surg.*, 1927, vol. 14, Part II.

(2) Ibid: Pulmonary Tuberculosis. Recent types of operation. *J. A. M. A.*, April 14, 1934, vol. 102.

(3) Ibid: Pulmonary Tuberculosis; Thoacoplastic Apicolysis. *Jour. Internat de Chir.*, Tome 1, no. 3, p. 11.

# Hemorrhagic Bronchitis

THE SPITTING of blood from the respiratory passages has always been considered the evidence of a tuberculous infection until proven otherwise. Before the universal use of the microscope and x-ray it was very difficult to classify cases of hemorrhage from the respiratory tract. Careful investigation with the microscope and x-ray is proving that a large number of these cases are not tuberculous, but are caused by various other infections or conditions.

I will not attempt to go into a lengthy discourse on the differential diagnosis of blood spitting, but will only try to describe and report a series of proven cases of a condition that was first recognized by the French. Until a comparatively recent date this condition found very little place in the literature of America. This condition, as I term it, is hemorrhagic bronchitis. One name applied to the disease was Catellani's hemorrhagic bronchospirochetosis. It was apparently carried into France by Asiatic laborers and soldiers, and studied anew during the war by Violle, Dalimier, and others (*Presse medicale*, July 5, 1917, July 18, 1918, and March 10, 1919).

It is a well known fact that the bronchial tree and mouth may harbor a large variety of organisms without undergoing a definite pathological change or showing symptoms and I am only reporting cases where we were able to find the combination of fusiform bacilli and a large number of spirochaetes and symptoms that cause the patient to seek medical aid.

A large percentage of these cases were treated by me personally. Repeated microscopical examination of smears from the throat, oral cavities, and bronchial sputum showed the disappearance of these spirochaeta and fusiform bacilli, also the clearing of symptoms after treatment. This, in my opinion, establishes the fact that they were the causative

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agents in the condition described as hemorrhagic bronchitis.

We did not include cases that had gone on to lung abscesses, lung gangrene or complications with bronchiectasis. About forty cases have been found in the past five years at our clinic.

There were two cases in this series that were known to have chronic fibroid pulmonary tuberculosis, but I proved to my own satisfaction, by careful examination and observation, that the blood was not caused by a reactivation of the tuberculous lesion. Both cases reacted well to sodium bismuth thio-glycollate and neo-arsphenamin treatment.

The Sodium Bismuth Thio-Glycollate used was a watery solution given intramuscularly; doses administered according to the patient's weight (0.2 grams, or 3 grains, for an average person of one hundred and fifty pounds) were given every fourth or fifth day. The reactions were carefully watched and the kidneys checked before and after treatment. Usually six to ten injections were necessary before the condition cleared.

Neo-Arsphenamin was used in small doses, .2 to .3 grams, once a week, intravenously for six to eight doses.

The physical findings in these cases were not at all constant; in some instances they were very slight, but they were always more marked in the bases of the lungs. The x-ray findings were likewise inconstant, but confined to the hilus region and bases.

The condition generally consists of a relatively mild bronchitis, but one which is accompanied by bloody sputum containing innumerable spirochaetal organisms. The period of incubation is short (one to two days); soon the patient begins to complain of a slight pain in the tracheobronchial region; he is seized with a harsh, annoying cough—almost exclusively at night, and expectorates a certain

amount of mucus and blood. The sputum presents a characteristic appearance, being homogeneous, rose-colored, and comparable to currant jelly; it is copious and soon becomes mucopurulent and greenish. After a few days intermission a fresh exacerbation occurs with elimination of the same kind of sputum. The latter contains enormous numbers of the spirochaeta bronchialis, which are characteristically variable in their morphologic features. This germ is met with in the discharge from the lungs, also from the throat and mouth.

Where the possibility of this disorder has not been kept in mind and bacteriologic examination of the sputum has been omitted, a mistaken diagnosis of tuberculosis as almost sure to be made. This condition is found in sub-acute and very chronic stages, sometimes going on to an abscess, gangrene or bronchiectasis if it is allowed to continue untreated.

The germs concerned in this disorder can be clearly seen upon examination of fresh sputum between a slide and cover-glass. They occur either singly or in dense clumps. When free, they are actively motile, appearing as small vibrating cords. When their motion slows down, the wave-like movements show greater amplitude as well as reduced rapidity; the spirochaete resembles an eel slowly worming its way past a series of obstacles.

Beautiful preparations may be obtained with the ordinary stains, such as gentian violet, crystal violet, and so forth. Interpretation of the smear is rendered very easy, however, if the silver salt method of staining is employed. The spirochaeta bronchialis appears stained a beautiful black against a red brown background and cannot be missed even upon the most cursory examination.

In some cases extreme nervousness, fatigue, temperature, loss of appetite and all the subjective symptoms that go with pulmonary tuberculosis are found. We did not use an intradermal tuberculin test on these cases.

The blood picture varied very much, but in no case showed marked signs of

leukocytosis. Therefore, I do not consider this symptom worth checking, other than in a general measure. Hemoglobin varied markedly from sixty to ninety percent. This was also not constant with the improvement other than in a general way.

I submit the following fourteen cases, omitting irrelevant history and symptoms:

Case 1: female, 25 years. Her history and symptoms were as follows: She had a severe cough, rusty sputum, occasional hemorrhage, foul breath odor and was extremely nervous. Her physical findings were a few scattered sonorous and sibilant rales over both lung bases. The x-ray showed her right lung slightly increased in all linear markings, more marked in the base. The left lung showed an area of increased density in the upper portion of the lower third to the fifth interspace. Laboratory findings showed that the gums and throat, as well as the bronchial sputum, were positive for fusiform bacilli and spirochaete. The bronchial sputum was negative for tubercle bacilli. This case was treated with Neo-Arsphenamine, .3 gram weekly for ten weeks, and the results were good. The same condition recurred within two years, but after the same treatment equally good results were obtained.

Case 2: male, 30 years old. His history and symptoms consisted of severe hemorrhage, eight to ten ounces, for two months before entering the sanatorium. He had lost a little weight and complained of slight fatigue, a medium cough, and expectoration. There were very slight physical findings at the time of his admittance, with the exception of his mouth and teeth. There were several badly decayed teeth in his mouth and the gums were soft, spongy, and pussy. The x-ray revealed irregular bronchial markings with a questionable multiple abscess. The left lung showed increased hilus markings with a few calcified tubercles. Smears from the gums and throat were found to be positive for fusiform bacilli and spirochaete, but was negative for tubercle positive for fusiform bacilli and spiro-



chaete but was negative for tubercle bacilli. We treated him with Sodium Bismuth Thio-Glycollate, intramuscularly, using 0.2 grams, or 3 grains, weekly. After the second injection the removal of the bad teeth was started. The results on this case were good.

Case 3: female, age 38. She had a history of arrested chronic fibroid pulmonary tuberculosis. For ten days prior to her entrance to the sanatorium she had had low grade afternoon temperature and a series of small hemorrhages, followed by streaked sputum. The physical findings were: in the right lung there was a marked increase in very harsh breath sounds and there were a few scattered medium coarse rales. There were medium coarse rales scattered over the greater portion of the left lung and diminished resonance over the entire lung area. The x-ray revealed that there were a number of scattered, healed, tubercles throughout the greater portion of the right lung. There was some increase in linear markings in the upper portion of the lower third of the right lung. The heart shadow was displaced approximately one inch. There were numerous scattered heated tubercles throughout the entire left lung. The diaphragm was two and one-half inches higher on the left side than on the right. This was the result of a phrenic evulsion four years previous to that time. Smears from the gums and throat, as well as the bronchial sputum, were shown to be positive for fusiform bacilli and spirochaete. The bronchial sputum was negative for tubercle bacilli. This case was treated with Sodium Bismuth Thio-Glycollate, 0.2, intramuscularly, every ten days for five doses. The results were good. This patient had been teaching for a year with no toxic symptoms and we had no reason to connect her hemorrhage with her chronic tuberculosis condition. She returned to work after six weeks of the Sodium Bismuth Thio-Glycollate treatment and is doing splendidly.

Case 4: a young woman, age 29. She had a history of arrested chronic fibroid tuberculosis. Her symptoms consisted of

a hemorrhage of from one to two ounces, a slight cough, and low grade afternoon temperature. The physical findings were harsh breath sounds with medium coarse rales over the upper third of both lungs and slight diminished resonance over the same area. The x-ray showed marked fibrosis of the upper third of the right lung with increased linear markings throughout the entire lung. The left lung showed marked fibrosis with calcified tubercles in the upper third with a few scattered, healed, tubercles in the hilus region and base. There was no evidence of active tuberculosis. Gum and throat smears and the bronchial sputum were positive for fusiform bacilli and spirochaete. The bronchial sputum was negative for tubercle bacilli. Neo-Arsphenamin was used intravenously, .2 gram every ten days for six doses, producing good results. This patient continued to work while taking the treatment.

Case 5: male, age 40. This patient had hemorrhages several weeks after a fall. Examinations by different specialists failed to make a direct connection between the fall and the hemorrhages. He had a slight cough and expectoration. There were a few scattered coarse rales in the lower third of the right lung, otherwise both lungs were apparently normal. The x-ray revealed in the right lung a marked increase of linear markings throughout the hilus and lower third with some small scattered irregular shadows, which did resemble tubercles. The left lung showed a marked increase of linear markings in the lower portion. Smears from the gums and throat were positive for fusiform bacilli and spirochaete. The bronchial sputum was positive for spirochaete, but negative for tubercle bacilli. Good results were obtained by treatment with Sodium Bismuth Thio-Glycollate. He was given two doses. After a few weeks of rest the patient returned to work without symptoms and has continued so for the past several months.

Case 6: male, age 26. His symptoms consisted of hemorrhage, slight cough and expectoration. The physical findings



were sonorous and sibilent rales over the entire lung field. The x-ray showed heavy linear markings throughout both lungs. The hilus region was much denser than in the normal individual of his age. Laboratory findings were positive for fusiform bacilli and spirochaeta from the bronchial sputum and smears from the gums and throat. Four doses of Sodium Bismuth Thio-Glycollate were given him with good results. This patient continued to work and improved markedly with postural drainage and bismuth treatment.

Case 7: male, age 38. This patient was suffering from back-ache, fatigue, shortness of breath, and cough. His sputum was muco-purulent and blood streaked. A few scattered coarse rales were found over the lung field and were more marked in the bases of the lungs. In the x-ray, both lungs showed a marked increase in hilus and linear markings. Bronchial sputum, gum and throat smears showed positive for fusiform bacilli and spirochaete. Sodium Bismuth Thio-Glycollate was given intramuscularly weekly for six weeks and the necessary dental work was done as well as the tonsils removed, giving good results.

Case 8: female, age 45. This case had symptoms of profuse hemorrhage, cough and expectoration, loss of weight, extreme nervousness, and low grade afternoon temperature. The physical findings were: sonorous and sibilent rales over the lower half of the right lung, also diminished resonance over this area. The left lung was apparently normal. The x-ray showed that the right lung had irregular bronchial markings and a questionable multiple abscess in the mid portion of the lower third. It also showed that the left lung was apparently normal. Due possibly to recent dental work, the mouth was found negative for fusiform bacilli. The throat smear showed positive for fusiform bacilli and spirochaete. The bronchial sputum was likewise positive for fusiform bacilli and spirochaete. The treatment administered was postural drainage and Neo-Arsphenamin given intravenously, .2 for four doses. This gave excellent results.

Case 9: male, age 20. Hemorrhage, fatigue, nervousness, slight loss of weight, and low grade temperature were the symptoms given in this case. The x-ray showed increased linear markings throughout both lungs. The gums, throat, and bronchial sputum showed positive for fusiform bacilli, but were negative for tubercle bacilli. We advised arsenical medication, but the patient failed to return for treatment.

Case 10: young man, age 23. The patient complained of slight cough, marked fatigue, sore throat, hemorrhage, and very foul breath. His tonsils and throat were badly inflamed. The x-ray revealed marked increase of linear markings throughout both lungs and more marked in the hilus region. The gums, throat and bronchial sputum were positive for fusiform bacilli and spirochaete. The sputum was negative for tubercle bacilli. Results were very good from Sodium Bismuth Thio-Glycollate treatment given intramuscularly weekly for six weeks. After the bismuth injections the tonsils were removed and the throat healed readily.

Case 11: male, age 48. The symptoms in this case were hemorrhage, extreme nervousness, fatigue and foul breath. A few scattered rales were found throughout both lungs. An x-ray showed marked increase of linear markings throughout both lungs. The laboratory findings for the throat and bronchial sputum were positive for fusiform bacilli and spirochaete, but negative for tubercle bacilli. This case was referred to the family doctor and Sodium Bismuth Thio-Glycollate treatment was advised.

Case 12: male, age 24. His symptoms were slight temperature, profuse hemorrhage, marked fatigue, extreme nervousness, and cough. The physical findings were coarse rales throughout both lungs, more marked in the lower portions, otherwise apparently normal. In the right lung marked increased densities through the hilus and intermediate portion were shown in the x-ray. Increased linear markings with two definitely calcified tubercles in the hilus region appeared

in the left lung. The gums, throat, and bronchial sputum were found positive for fusiform bacilli and spirochaete. The sputum was negative for tubercle bacilli. Sodium Bismuth Thio-Glycollate was given intramuscularly weekly for six doses, producing splendid results. This patient continued to work during the treatment.

Case 13: male, age 60. This case noticed a rusty sputum for several weeks before reporting for examination. His physical findings were sibilent and sonorous rales over both lung fields. The x-ray showed marked increased linear shadows throughout both lungs, with some irregular shadows indicating some dilatation of the bronchi. Throat and bronchial sputum were positive for fusiform bacilli and spirochaete. The sputum was negative for tuberculosis. Neo-Arsphenamin treatment, .3 gram for six doses, one each week, was given, producing good results.

Case 14: male, age 48. Symptoms for this case were hemorrhage, nervousness, and fatigue, also low grade temperature in the afternoon. The physical findings were sonorous and sibilent rales over the greater portion of both lungs. Inspection of the x-ray showed scattered calcsified lesions throughout the lower two thirds of both lungs, varying in size from one-half to two cm in diameter. There were also irregular markings throughout the entire two-thirds of the lungs. The throat and bronchial sputum were found positive for fusiform bacilli and spirochaete. The sputum was negative for tubercle bacilli. Good results were obtained from arsenicals, given intravenously.

Hemorrhagic Bronchitis is a condition which is contagious and is definitely in-

creasing in America, or the condition has been mis-diagnosed heretofore. The diagnosis is relatively simple by a careful microscopical study of the bronchial sputum with observation and x-ray. Special precautions should be observed in the collection of the specimens because similar organisms are normally found on the teeth, at the gum line, and in the crypts of the tonsils. Preliminary use of the toothbrush, mouth-washes, and gargles are of vital importance. Bronchial spirochaete rapidly disappear from sputum so that the specimen should be examined within one-half hour after it is coughed up.

It must be borne in mind that a spirochaete infection may complicate pulmonary tuberculosis or other lung conditions. It responds very readily to the proper treatment which should be oral hygiene directed by a competent dentist, clearing up the foci of infection in the throat by a nose and throat man, postural drainage and some form of bismuth or arseniacle treatment, together with general hygienic and dietetic measures to increase the patient's resistance.

The seriousness of this condition lies in the fact that it resembles tuberculosis so closely. The distinction between these two conditions cannot be made too carefully. If a case of pulmonary tuberculosis is treated with arsenicals and bismuth some harm can be done. At the same time, if a case of hemorrhagic bronchitis is treated on ordinary lines of pulmonary tuberculosis very little result can be expected. One may be advised to make radical changes in the mode of living at great expense and discomfort when treatment can be effected by the physician who makes the proper diagnosis.

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## The Treatment of the First Six Months of Pulmonary Tuberculosis\*

NO DOUBT you have noticed that I have been assigned the difficult task of discussing "The Treatment of the First Six Months of Pulmonary Tuberculosis."

In order to bring the subject within the scope of my experience, I shall take the liberty of discussing "The First Six Months' Treatment of Pulmonary Tuberculosis."

A few decades ago, the treatment was relatively simple. The family physician understood that an early diagnosis was important; but early or late, he was comforted by the fact that the treatment remained the same. Today, the family physician who makes a diagnosis of pulmonary tuberculosis faces a most difficult task. He is immediately confronted with the grave responsibility of determining whether the case is minimal, moderately advanced, or advanced; whether it is acute or chronic; whether predominantly unilateral or bilateral. He must also recognize the presence or absence of cavities and, if cavities are present, he must determine their size and location, the character of their walls, and the condition of the surrounding tissues. He must consider the pleura, and, if possible, determine the presence or absence of adhesions; he must ascertain the position and mobility of the diaphragm and the mediastinal structures; he must attempt at least a clinical estimate of the vital capacity of the lungs; he must appraise the cardiovascular system, with particular reference to the integrity of the heart muscle; he must recognize serious complications when present, as well as other associated pathological conditions.

These demands require unusual knowledge of the anatomy and physiology of

BY

LEWIS J. MOORMAN, M. D.

Oklahoma City, Oklahoma

the intrathoracic organs; an appreciation of the pathology of tubercle from early proliferation to cavity for-

mation; special skill in physical diagnosis, plus the wisdom of clinical experience, also fluoroscopic service and good stereoscopic x-ray films. Other laboratory facilities and occasionally additional highly technical procedures are necessary in certain cases.

There must be a choice between home treatment and institutional treatment. In those chosen for institutional treatment, there must be a choice between routine management and surgical collapse; in those chosen for surgical collapse there must be a choice between artificial pneumothorax, intrapleural and extrapleural pneumolysis, phrenic-nerve interruption or intercostal neurectomy and thoracoplasty. Often there must be a decision with reference to simultaneous bilateral or successive bilateral pneumothorax; also with reference to cautious combinations of the various surgical procedures mentioned above.

It is obvious that modern advances in the treatment of pulmonary tuberculosis have brought a multiplicity of problems. It is equally obvious that the family physician working alone cannot adequately meet all the above requirements. Even those who specialize in diseases of the chest must resort to team work in order to accomplish the best results. It is unfair to both physician and patient to leave the management of pulmonary tuberculosis wholly in the hands of the family physician.

While there has been no change in our opinion with reference to the efficacy of the fundamental principles of treatment, rest, diatetic and hygienic, and while in certain cases these principles can still be successfully applied in the home environ-

\*Paper given at the Get-Together Luncheon of The Federation of American Sanatorium Association; Kansas City, May 12, 1936.

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ment, modern therapeutic advances, which have proved such a boon to those suffering from advanced tuberculosis, require the equipment and facilities of the sanatorium and the hospital. The minimal and moderately advanced cases not responding to routine management, and all advanced cases, require special diagnostic consideration in order to determine appropriate therapeutic measures. With rare exceptions, such diagnostic studies cannot be successfully pursued in rural communities. Neither is it possible to apply the respective modern therapeutic measures outside of the well-ordered institution.

The above discussion makes obvious the fact that the difficulties are not only professional, but environmental as well.

If these difficulties are not overcome, many of those suffering from tuberculosis will be denied the opportunities for recovery and many, who are not yet obviously tuberculous, will be unnecessarily exposed to infection.

In closing may I say the first six months' treatment, like that of the last six months', is dependent upon an intelligent diagnostic survey of the case with a view of carefully applying the varied modern therapeutic measures in such a way as to meet each patient's individual needs. The advantageous application of ever-increasing knowledge in the field of pulmonary therapy demands intensive cooperative professional efforts, with increasing emphasis upon the patient's individual needs.

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COMPRESSION THERAPY IN FAR ADVANCED TUBERCULOSIS—(Continued from page 15).

was only half completed. The operation, since it has become one more radical in character, must of necessity be performed in more stages. The operation is more radical yet we are still operating on chronically ill patients and when ribs are removed in their entirety the number attacked in each phase of the operation should be less.

Just recently we have made a survey of 60 patients operated on by the more radical thoracoplasty and were rather surprised to find a rather large number of patent cavities. Only 78.43 per cent of patients operated on showed closure of cavities with negative sputa. A number of these patients operated on in recent months may be further benefitted by re-operation which will, of course, somewhat increase the number of cavity closures. To date no routine thoracoplastic operation will close all cavities and one has to re-operate, selecting one of the various re-operative procedures as best suits the individual patient.

In conclusion we wish to state that we believe we have shown you a sufficient number of x-ray film series to definitely establish the value of bilateral pneumothorax in far advanced bilateral tubercu-

losis. The films of the patients who have completed their therapy, show pulmonary re-expansion and checked by subsequent films should be rather interesting.

We have the present series of films on a rather large number of patients operated on by thoracoplasty in the presence of contralateral pneumothorax and a goodly number of these patients have had their therapy completed. It is believed that if you consider the initial x-ray film on many of these patients their prognosis as to recovery seems hopeless, yet by radical methods applied cautiously, disease arrest was obtained.

We have used thoracoplasty almost entirely for lung collapse where more conservative collapse therapy has failed. There has been a trend of conservatism throughout our discussion yet we have shown you x-ray films demonstrating collapse therapy in its most radical form, but we believe you will agree that what has been done in each patient was necessary to obtain adequate collapse. Adequate collapse should be gained in all patients utilizing the simplest and most conservative therapy to effect that collapse.



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## ABSTRACT

**SCHWALM, ERICH:** Experiences with the Gerson Diet in Pulmonary Tuberculosis. *Klin. Wochschr.*, p. 1941.

In the German daily press there have appeared statements that by means of the Gerson diet the severest cases of pulmonary tuberculosis have not only greatly improved, but have been practically cured. On the other hand, in the scientific tuberculosis literature there has been only unfavorable mention of the method and its results. Schwalm put 20 cases of pulmonary tuberculosis on the Gerson diet in connection with mineralogen and phosphorus cod-liver oil. In some of the cases the use of cod-liver oil was omitted in order to try out more conclusively the effects of the Gerson diet and the mineralogen. As a substitute for the phosphorus, cod-liver oil recresal was given. In spite of the fact that there was no difficulty in making the

diet palatable, in the majority of the patients there arose sooner or later a disinclination, or even a pronounced aversion, to the salt-free diet. Schwalm regards this as a point of some importance in relation to the use of such a diet for tuberculous patients who frequently suffer from loss of appetite. The mineralogen was always unwillingly taken. From his experience with these 20 cases, the author draws the following conclusions: In no one of the twenty cases of pulmonary tuberculosis treated by the Gerson diet was any improvement of the pulmonary condition noted. No objective change could be observed in these patients that could be interpreted in the sense of a detoxication or alteration in tone. The weight increase fell within the same limits as occurs ordinarily under sanatorium treatment. For

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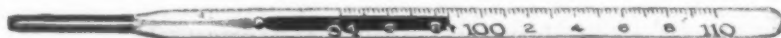
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the increase in weight, the phosphorus cod-liver oil appeared to be of the greatest moment, a fact already known in tuberculosis therapy. No advantage on the part of the Gerson diet could be shown over the usual diet of the German Sanatoria in which the vitamins also play a part. The author closes with the wise remark that in

case of a more extensive trial of the Gerson diet, such should be placed in the hands of experienced tuberculosis therapists, who through their many years' experience in the management of large sanatoria are fitted to make accurate observation and judgment of the results of such treatment.



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